Denali Geology

Do you have a mountain near where you live? Students who live near Denali National Park and Preserve in Alaska do. It's the tallest mountain in North America. It's known as Mt. McKinley to many people, but in Alaska, people call it Denali. The word "Denali" means the "High One" in the native Alaskan language. At 20,320 feet (6,194 meters), it's definitely high!

The shorter, darker mountains in front of Denali have elevations of around 12,000 feet! (NPS Photo Tim Rains)

Denali is part of the Alaska Range, a 600-mile (966-km) long range of mountains. The Alaska Range stretches from the Alaska Peninsula in the west to the Canadian border in the east. The Alaska Range is highest in its middle. That's where you will find Denali National Park and Preserve. Denali is an area of towering peaks and massive glaciers.

Mt McKinley National Park was established in 1917. In 1980 it was renamed Denali National Park and Preserve. The Park now covers 6 million acres (that's almost twice the size of the state of Connecticut!). Besides all of the tall mountains in the park, you will also find large areas of tundra and taiga forests. Many different types of birds and mammals live in the park, including ptarmigan, Dall sheep, grizzly and black bears, caribou, wolves, and moose.

Moose

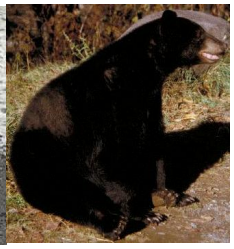
Ptarmigan

Wolf track

Grizzly bear

Dall sheep

Caribou



Black bear

Mountain-climbers from around the world come to Alaska to climb Denali. It is one of the Seven Summits. The Seven Summits include the tallest mountains on each of the seven continents. Many other people visit Denali National Park and Preserve to enjoy its scenic beauty and wildlife. They all hope to catch a glimpse of Denali when it's not being hidden by clouds. It is said that only 30% of the visitors who come to Denali actually get to see the mountain.

Geology is an important part of the Park. The word "geology" comes from the Greek word that means Earth. Geology is the science that deals with Earth's history, what it's made of, and how it's put together. Geologists study forces that shape Earth's surface: earthquakes, volcanoes, glaciers, and drifting continents. They also study landforms, features of the Earth's surface. Visitors to the Park experience the beautiful and complex geology that is there, including the mountains, glaciers, rocks and streams.

Glaciers are slow-moving rivers of ice. (Photo Sue Jagoda)

The geology of Denali is very complex. Geologists are only beginning to piece together its puzzling past. The Park has rock formations that have been carried there from thousands of miles away, fossils of ancient creatures that have been plowed up from ocean depths, new rocks made deep within the Earth's core, and some of the oldest rocks in Alaska.

The Earth's mountain-building forces have created spectacular peaks in the Alaska Range. Mt. Denali's elevation and its distance from the equator are the reasons it's always winter on top. Some of the snow never melts. Over time the snow is squeezed together to form glaciers, slow-moving rivers of ice. The glaciers in Denali have created many interesting landforms.

Geologists have lots of questions about what they observe at Denali. How are mountains born? What are they made of? Why is Denali so big? How do glaciers form? How does the mountain impact Alaska's climate? Why are there so many different kinds of rocks in Denali National Park and Preserve? These are just some of the questions that challenge geologists and other scientists who come to study Denali. There are still many unanswered questions about Denali's geology.

Photo Credits: p. 1, Moose, Ptarmigan, wolf tracks (Sue Jagoda); Grizzly bear, Dall sheep, Caribou, Black bear (NPS photos)

TO DO:

These are the elevations of some mountains and hills in different regions of the United States. Use this data to draw a graph to compare the elevations.

Mountain, State	Elevation (ft)
Mt. McKinley, AK	20,320
Mt. Whitney, CA	14,505
Mt. Rainier, WA	14,417
Mauna Kea, HI	13,796
Mt. Katahdin, ME	5,270
Harney Peak, SD	7,242
Mt. Washington, NH	6,288
Mt. Mitchell, NC	6,684
Eagle Mountain, MN	2301
Britton Hill, FL	345

If you'd like to learn more about Denali and geology, check out these resources:

Web:

Denali Discovery Hike: A Virtual Tour
http://www.nps.gov/features/dena/002/edisco/eDisco.swf

Denali Park Geology
http://nature.nps.gov/geology/parks/dena/index.cfm

Geologic Wonders of the National Parks
http://nature.nps.gov/geology/geologic_wonders/

NPS Web Rangers
http://www.webrangers.us/

This Dynamic Planet: World Map of Volcanoes, Earthquakes, Impact Craters, and Plate Tectonics
http://pubs.usgs.gov/imap/2800/

USGS What on Earth Is Plate Tectonics?
http://nature.nps.gov/geology/usgsnps/pltec/pltec1.html

Views of the National Parks: Investigate Glaciers
http://nature.nps.gov/views/Classic/Index_Glaciers.htm#

Virtual Interactive Panoramas
http://www.nps.gov/dena/photosmultimedia/vr-panos.htm

Virtual Tour of Landscape Change in Denali

http://www.nps.gov/features/dena/003/landchange/virtual_tour.html

Wrangell - St Elias National Park & Preserve (glaciers and plate tectonics)
http://www.nps.gov/wrst/naturescience/glaciers.htm
http://www.nps.gov/wrst/naturescience/geology.htm

Print Resources:

Alaska Science Nuggets, by Neil Davis. 2008. University of Alaska Press, Fairbanks, AK. ISBN: 0-912006-38-2.

Alaska's Glaciers: Frozen in Motion, by Katherine Hocker. 2006. Alaska Natural History Association, Anchorage, AK. ISBN-10: 0930931769.

Apun: The Arctic Snow, by Matthew Sturm. 2009. The University of Alaska Press, Fairbanks, AK. ISBN-10: 1602230692.

Denali: Climbing America's Highest Peak, *by Mary Palmer. Paws IV Publishing, Homer, AK, 1996. 0-934007-27-6 (Out of print, but may be available in used book stores or via interlibrary loan.)*

Girls Who Looked Under Rocks: The Lives of Six Pioneering Naturalists, by Jeannine Atkins. 2000. Dawn Publications, Nevada City, CA. ISBN-10: 1584690119.

Roadside Geology of Alaska **(Roadside Geology Series),** by Cathy Connor. 1988. Mountain Press Publishing Company, Missoula, MT. ISBN-10: 0878422137.

Rockhounding Alaska: A Guide to 75 of the State's Best Rockhounding **Sites (Rockhounding Series)**, by Montana Hodges. 2010. FalconGuides, Guilford, CT**.** ISBN-10: 0762750847.

Rocks, Ridges & Glaciers: A Geologic Tour along the Denali Highway, Alaska, by William R. Diel and Arthur C. Banet, Jr. 2004. Bureau of Land Management, Public Information Center, 222 W. 7th Avenue #13, Anchorage, AK 99513.

Sculpted by Ice: Glaciers and the Alaskan Landscape, by Michael Collier. 2004. Alaskan Natural History Association, Anchorage, AK. ISBN-10: 0930931238

The Geology of Denali National Park & Preserve, by Michael Collier. 2007. Alaska Geographic Association, Anchorage, AK. ISBN: 978-0-930931-04-9.

Up on Denali: Alaska's Wild Mountain**,** by Shelley Gill. 2006. Sasquatch Books, Seattle, WA. ISBN-10: 1570613656.